THE OIT TIMES

"Turning Industry Visions into Reality"

Vol. 3, No. 3

SUMMER 2000

OIT streamlining its R&D proposal solicitation process

Customer Day comments drive swift action, dramatic changes

When Denise Swink, DOE's Deputy Assistant Secretary for Industrial Technologies, sat down with OIT customers at February's Customer Day and asked "How can we serve you better?" —it wasn't a rhetorical question. Within days, Swink was in Idaho to confer with managers at the DOE Idaho Operations Office about taking aggressive action to address the number one complaint of OIT's customers.

"Our customers told us very clearly: 'All the forms we need to fill out and information we need to provide make it hard for us to work with you,'" said Swink. "To me, that means that our best technical partners might not be working on as many projects as they could, and some great ones might be discouraged from working with us at all. Who knows what energy-saving technologies might never be developed because of this added bureaucracy? We wanted to make changes *immediately*."

So, by the time the next Industries of the Future R&D proposal solicitations—including those directed at the **Petroleum** and **Aluminum** industries—were released a few weeks later, many dramatic changes were already evident. For example, rather than demanding a full scale, highly detailed proposal up front, initial submissions require only a 10 page "overview" and a one page cost summary sheet, an innovation similar to that pioneered by OIT's **Forest Products** Team. Pre-award audits will now be conducted on an "as-needed" basis only, and the solicitation package itself has been simplified and shortened, with clearer language and fewer mandatory forms and certifications.

"The bottom line," said Swink, "is that successful proposers can get their funds faster and their work underway much sooner. Those whose proposals were not chosen this time around will have invested minimal time in the effort, and so are better positioned to participate again."

(continued on page 3)

Pittsburgh Showcase demonstrates latest technology advances in steel industry

On May 3-5, 2000, OIT, the steel industry, and the State of Pennsylvania hosted "A Celebration of New Steel—The Pittsburgh Regional Technology Showcase." The event—launched by DOE Assistant Secretary Dan Reicher—demonstrated several energy efficiency and productivity advancements now benefitting the industry. Guests from throughout the steel industry, equipment suppliers, trade associations, national labs, universities, and government attended the event that featured plant tours and technical sessions by some of the nation's leading steel researchers.

The steel industry is a participant in OIT's "Industries of the Future" initiative. OIT, the American Iron and Steel Institute, the Steel Manufacturer's Assoc., and the State of Pennsylvania partner to develop and deploy more energy efficient technologies and practices. The Showcase highlighted the steel industry's continued progress in achieving its vision of the future through industry/government partnerships and energy-saving technologies and processes resulting from this partnership. The Showcase demonstrated the benefit of these partnerships through plant tours, exhibits, and technical sessions.

(continued on page 5)

INSIDE

Several attractive new opportunities emerging from OIT R&D portfolio

At any given time, OIT is co-funding as many as 500 R&D projects with industrial and other partners. Many of these projects offer the potential to save significant energy for industry while also helping to cut costs and improve competitiveness. Below is a review of several current projects that seem particularly promising. For further information about any of these projects or others in our portfolio, please contact the OIT Clearinghouse at 1-800-862-2086.

Mining
Imaging ahead of mining

OIT's **Mining** Team, Sandia National Lab, CONSOL, Kennecott Exploration, Stolar Horizon, and West Virginia Univ. are applying a superior imaging algorithm (originally developed for DOD) with the Radio Imaging Method (RIM). By using data from RIM, the new imaging scheme reveals the distribution of electrical resistivity at the host rock-ore seam interface and shows any anomaly in the seam ahead of the mining face. Conventional tomograghy (CAT) scans can then be used to evaluate the results against current RIM acquired data. Allowing mining operations to see beyond the mining face will improve mine planning, decrease equipment wear, increase energy efficiency and produce a higher quality product.

Steel
Galvanneal temperature sensor

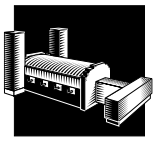
OIT's **Steel** Team, along with project partners from the American Iron & Steel Institute, Bailey Engineers, National Steel Corporation, ORNL, University of Tennessee and Weirton Steel, will develop a fast accurate temperature feedback technology for galvanneal steel. These remote, real-time measurements will reduce product variability and energy consumption while increasing operating profit. Longer-term expectations include smaller scale systems and fiber optic probes allowing for immersion measurements with similarly high accuracy. Estimated benefits for the steel industry include 1.3 trillion Btu of energy savings per year and a cost savings of $7.2 million annually.

Metalcasting
Lost foam casting

The lost foam casting process is a breakthrough technology for the metal casting industry. The University of Alabama-Birmingham and the Lost Foam Casting Consortium, led by the American Foundrymen's Society, are partnering with OIT's **Metalcasting** Team on this project. Lost foam offers a number of energy and environmental advantages. A study conducted by the University of Alabama Birmingham, comparing the energy usage of both lost foam and conventional sand casting, showed that the lost foam process uses approximately 27% less energy. The process also allows designers to consolidate parts, reduce machining and minimize assembly operations.

Aluminum transmission housing produced by "lost foam process."

Glass
Waste heat warms batch and cullet charge



Because of the widespread use of oxyfuel-fired furnaces, OIT **Glass** Team partners at Corning, New York Gas Group, NYSERDA, Praxair, and Thermo-Power are developing a Raining Bed Preheater technology. It will help reduce energy use of oxyfuel furnaces and improve their productivity by up to 25%. The Raining Bed Batch/Cullet Preheater uses waste heat to preheat crushed recycled glass and raw materials before they are fed to the furnace. The batch and cullet is fed from the top of the furnace where it encounters hot combustion gases rising from below.

Aluminum
Probe and filter commercialization

A main initiative of the aluminum industry is to improve metal quality and purity. Selee Corporation and Alcoa, with support from OIT's **Aluminum** Team, tested a simple electric probe that senses the presence of salts in molten aluminum. In addition, Selee invented a new filter, which selectively removes liquid salts from liquid metal, alleviating the impurities and contamination incurred during the casting process. To date, Selee has manufactured over 200 probes and is currently conducting tests within various commercial plant sites. They are also developing a more portable data unit for implementing and measuring the results, which engineers will take with them when traveling to an aluminum cast shop.

STREAMLINING *(continued from page 1)*

According to Swink, a key to the fast and dramatic changes in the solicitation process was the cooperation and proactivity of the management team at the Idaho Operations Office, including new Chief of the Contracts and Assistance Branch, Mike Adams.

"Working with Denise, we found that there were many ways to simplify the financial assistance process," Adams explained. "Although Federal regulations regarding financial assistance awards are often simpler than those governing contracts, tradition over the years has led to their being managed in similar ways. Once we looked at the process with fresh eyes, we found a lot of opportunities to make the financial assistance process easier on everybody, while still maintaining the necessary controls."

According to Adams, the recent solicitations represent only the beginning of the Office's simplification and streamlining efforts.

"Like OIT, we are in a continuous improvement mode, and will be constantly monitoring the process to see where we can improve it," he said.

The Idaho Operations Office is one of several that assist OIT, and, according to Swink, similar changes are underway at both the Chicago and Golden (CO) offices as well. Indeed, Adams notes that, as part of their continuous improvement efforts, he is now in close contact with colleagues at the other Offices to not only help make their efforts consistent, but also share ways to continually improve the process for all Offices that serve OIT and its customers.

However, notes Adams, OIT and its customers won't be the only ones that benefit from a more efficient solicitation process. The improvements will also benefit the numerous other DOE entities served by the operations offices—as well as their many private sector customers.

"OIT started the ball rolling, helping us become more customer-focused," said Adams. "Our on-going efforts will ensure that we serve all OIT customers and all DOE customers better than ever before."

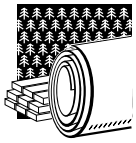
Got a Question? Call the OIT Clearinghouse 1-800-862-2086

Agriculture
Wheat milling byproducts

Mill feed is a by-product of wheat flour milling processes, resulting in 6.5 million tons of animal feed per year. This amount could be reduced by 50% if the carbohydrate content in the mill feed were used as valuable feedstocks for chemical production. OIT **Agriculture** Team partners—including Mennel Milling Co., Pacific Northwest National Lab, and Pendleton Flour Mills, Inc.–are developing a process to recover the starch for producing chemical feedstocks such as lactic acid, mixed glycols, polyols and alcohols. Energy use will be reduced significantly with electricity requirements falling 94%.

Got a Question? Call the OIT Clearinghouse 1-800-862-2086

Forest Products
Methane de-NOx® reburning technology

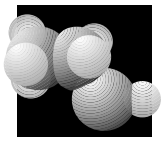


Waste minimization and energy efficiency are two guiding principals of the forest products industry. By adopting the use of low cost Methane de-NOx®, the forest products industry will avoid the pollution and cost of landfilling waste products after processing. Successfully demonstrated in commercial power plants, Methane de-NOx® injects natural gas directly into the lower region of the primary flame zone, increasing the combustion temperature and minimizing NOx formation. In conventional reburners, natural gas is injected above the primary combustion zone after the majority of NOx has been formed. OIT **Forest Products** Team partners at the Institute of Gas Technology, Detroit Stoker, and Boise Cascade will retrofit existing boilers with the Methane de-NOx® technology to burn biomass, wood waste solids, and sludges from the forest products industry.

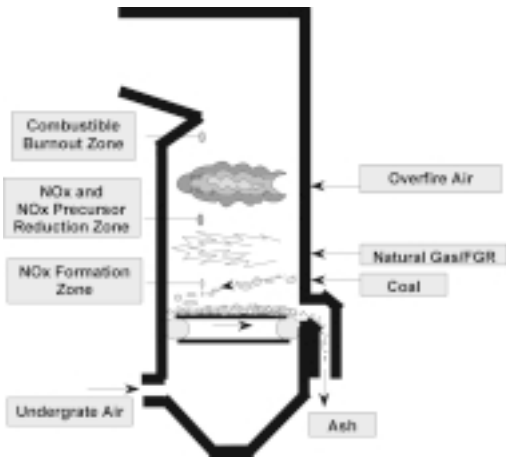
Petroleum Refining
Gas imaging for leak detection

Leak detection surveys within large US refineries are critical to emissions control and are mandated by the US Environmental Protection Agency (EPA). A partnership involving OIT's **Petroleum** team, the American Petroleum Institute, Laser Imaging Systems, Sandia National Lab, EPA and DOE's Office of Oil and Gas Technology will develop a portable gas imaging system to effectively identify these leaks at any point within the refinery. An infrared laser illuminates an area and then sends the image to a video camera. Any gases present in the video image appear as dark clouds and are easily identified as leaks needing immediate attention. With this portable optic system, inspections can be performed more frequently, with minimal staff resources, and repaired more rapidly.

Chemicals
New ethylene process eliminates NO_x, cuts CO_2



Ethylene manufacture is the most energy-intensive chemical process annually using over 400 trillion Btu of energy at a cost of over $1 billion. The **Chemicals** Team in collaboration with Dow, Univ. Minnesota, Reaction Engineering, Los Alamos and Sandia National Lab is investigating an alternative to the conventional steam cracking process used to manufacture ethylene. The new project features an internally-fired catalytic process that eliminates the need for a furnace and yields no flue gas. The collaborative team will use a combination of experimentation and modeling to gain a better understanding of catalyst and reactor vessel operational and design variables. Use of the new technology across the chemical industry could yield energy savings of up to 15 trillion Btu by 2010, and reduced NO_x and CO_2 emissions.



Spreader stoker boiler retrofit with Methane de-NOx technology

SHOWCASE *(continued from page 1)*

The event emphasized the importance of steel to the U.S. economy and the valuable role of Federal support in maintaining the industry's long-term competitiveness. Moreover, the Showcase demonstrated the many ways DOE is working with industry to improve efficiency and productivity through all facets of manufacturing and plant operations.

Participants attended breakout sessions on May 4 addressing such topics as:

- Pennsylvania steel technology initiatives
- Plant technologies and energy use analysis
- R&D
- Federal Government funding and assistance opportunities
- Best practices for higher productivity

The showcase featured plant tours at Weirton Steel, U.S. Steel's Edgar Thomson, and Koppel Steel facilities. During the tours, attendees witnessed a number of advanced steel manufacturing technologies in operation. Such technologies were developed with support from OIT's **Steel** Team as well as hundreds of partners from the steel industry and academia. These partners perform cost-shared R&D to address both DOE's national energy efficiency goals and industry goals such as those outlined in the steel industry's technology roadmap. The partnership has resulted in numerous technology advances that have been implemented at plants such as those toured at the event.

The plant tours demonstrated how OIT-supported R&D and "best practices" are enhancing the quality of steel and energy efficiency through featured technologies including:

- Double-ended laser basic oxygen furnace optical sensor
- Galvanneal temperature measurement sensor
- Infrared-based preheating of strip, nickel aluminide radiant tubes
- Nickel aluminide steel rolls
- Laser-based blast furnace burden temperature measurement sensor
- Basic oxygen furnace contour scannerless sensor
- A series of case studies examining improved control, steam, and compressed air systems

On May 5, showcase participants attended a Congressional Field Hearing on *The Future of the Steel Industry and the Role of Technology*. Chaired by U.S. Representative Mike Doyle, the hearing featured remarks by Senator Rick Santorum, and U.S. Representatives Ron Klink and Frank R. Mascara—all from the Pennsylvania state delegation. During the panel discussion, several witnesses provided testimony emphasizing the importance of government/industry partnerships. Statements were provided by Thomas A. Danjczek, President of the Steel Manufacturers Assoc.; Richard K. Riederer, President and CEO of Weirton Steel Corp.; Paul Wilhelm, President of the U.S. Steel Group and Vice Chairman of the USX Corp.; J. Roy Murray, Director of the Collective Bargaining Services Dept. of the Steel Workers of America, and OIT's Denise Swink.

Approximately 100 local college students attended the Showcase and participated in presentations and plant tours specially tailored for this group. In addition, an exhibit hall featured industry and government displays related to steel technology. During the event, Denise Swink presented an award to Curtis H. Barnette, Chairman Emeritus of Bethlehem Steel Corp., in recognition of his special contributions to the steel industry partnership with DOE.

"A Celebration of New Steel" was the second technology showcase jointly sponsored by DOE and the steel industry. Bethlehem Steel hosted the first showcase at its Burns Harbor, IN plant. Plans are underway for a third steel showcase due to the success in Pittsburgh.

OIT Solicitation Schedule *

Industry/Area	RFP	Due	Announced[1]	Funds[1]	URL
Agriculture	4/00	6/00	8/00	$2.3M	www.id.doe.gov/doeid/psd/proc-div.html
Ag Multidisciplinary University Prog.	Past	Past	9/00	$500-400k	www.id.doe.gov/doeid/psd/proc-div.html
Aluminum	5/00	7/00	9/00	$3M	www.oit.doe.gov/aluminum/alsolict.html
Aluminum Lab Call	5/00	7/00	9/00	$1.5M	www.oit.doe.gov/LCC
Chemicals Lab Call	Past	Past	9/00	$2M	www.ch.doe.gov/business/acq/chem
Chemicals	6/00	9/00	11/00	$4M	www.ch.doe.gov/business/acq/chem
Forest Products	Past	Past	11/00	$3M	www.oit.doe.gov/forest
FP—Biomass & black liquor gasification	Past	Past	8/00	$14M	www.oit.doe.gov/forest
Glass	Past	Past	10/00	$2.5	www.oit.doe.gov/glass
Inventions & Innovation	6/00	8/00	12/00	$2.3M	www.oit.doe.gov/inventions
Metalcasting	Past	Past	7/00	$1-2M	www.id.doe.gov/doeid/psd/solicit.html
Mining	7/00	11/00	1/01	$2M	www.oit.doe.gov/mining
NICE3 (accepting 2 page pre-proposals)	6/00	8/00	12/00	$4M	www.oit.doe.gov/nice3/grants/grants.shtml
Steel (American Iron & Steel Institute)s	6/00	9/00	TBD	$5-10M	www.id.doe.gov/doeid/psd/solicit.html
Plant Wide Energy Efficiency Assessments	6/00	10/00	12/00	$1-2M	www.oit.doe.gov/bestpractices

***** Information in this table is periodically updated. See OIT's Web site, www.oit.doe.gov/news/solicitations.shtml

[1] Approximate

New Publications

Title	Area	Product Type
New Steam Turbine Saves Chemical Manufacturer $2.3 Million Annually	Chemicals	Case Study
Improved Steam Trap Maintenance Increases System Performance and Decreases Operating Costs	Chemicals	Case Study
Reducing Steam Pressure Saves $42,000 Annually at Vulcan Chemicals	Chemicals	Case Study
Brazing and Spot Welding Innovations for Joining Aluminum Alloys	Aluminum/ Inventions	Fact Sheet
Development of the Automated Steel Cleanliness Analysis Tool	Steel	Fact Sheet
Dephosphorization When Using Direct Reduced Iron Pellets or Hot Briquetted Iron	Steel	Fact Sheet
Magnetic Gate – System for Molten Metal Flow Control Reducing the Variability of High Strength Low Alloys Sheet Steels	Steel	Fact Sheet
An Optical Sensor for Post-Combustion Control in Electric Arc Furnace Steelmaking	Steel	Fact Sheet
Controlled Thermo-Mechanical Processing of Tubes and Pipes for Enhanced Manufacturing and Performance	Steel	Fact Sheet
Development of an O^2-Enriched Furnace System for Reduced CO^2 and NO^x Emissions	Steel	Fact Sheet
Technology of Low Coal Rate & High Productivity of Rotary Hearth Furnace Ironmaking	Steel	Fact Sheet
Improved Surface Quality of Exposed Automotive Sheet Steels	Steel	Fact Sheet
Low-Nox Boiler Demonstration	Steel	Fact Sheet
Plant Trial of Non-Chromium Passivation Techniques for Electrolytic Tin Plate	Steel	Fact Sheet
Bethlehem Steel Technology Showcase	Steel	Success Story
Clean Production of Coke From Waste Carbonaceous Fines	Steel/I&I	Fact Sheet
Particulate Briquetting Technology for the Steel Industry	Steel/NICE^3	Fact Sheet
Atmospheric Recovery and Regeneration in Heat Treating Operations	NICE^3	Fact Sheet

To order copies, call 1-800-862-2086.

4th Biennial Industrial Energy Efficiency Expo coming in February

Plans for the *4th Biennial Industrial Energy Efficiency Symposium & Exposition* are in full swing. Next year's theme of "Global Competition: Challenges and Solutions" will provide the perfect forum to address international as well as domestic issues, speakers and future trends in technology. OIT's Expo will take place on February 19-22, 2001 in the Washington Hilton & Towers in downtown Washington, DC.

After surveying industry and past Expo participants, Eamonn Fingleton, renowned author and former editor of *Forbes* and *The Financial Times*, was chosen as a keynote speaker. Mr. Fingleton's most current book, "In Praise of Hard Industries: Why Manufacturing, Not the Information Economy, Is the Key to Future Prosperity" takes a look at the economic resurgence of US manufacturing.

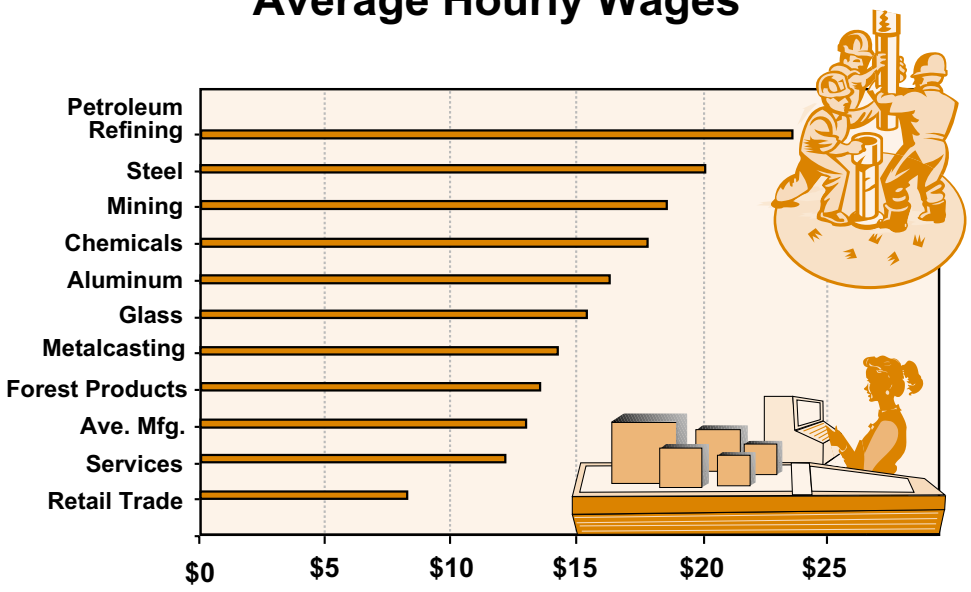
Some of the planned session topics include lean manufacturing, the impact of the Internet on industrial commerce, global climate change, workforce development, and industrial valuation and investment. The sessions will include expert panel discussions as well as case study analysis and presentations.

OIT is also partnering with the Junior Engineering Technical Society (JETS), a non-profit organization that involves high school students in engineering, science and mathematics programs. A rigorous annual exam, this year focusing on the nine OIT Industries of the Future, will be administered in late Fall. Winning teams from across the US will be invited to participate in an awards ceremony at Expo.

The latest Expo developments and registration information can be found at http://www.oitexpo4.com.

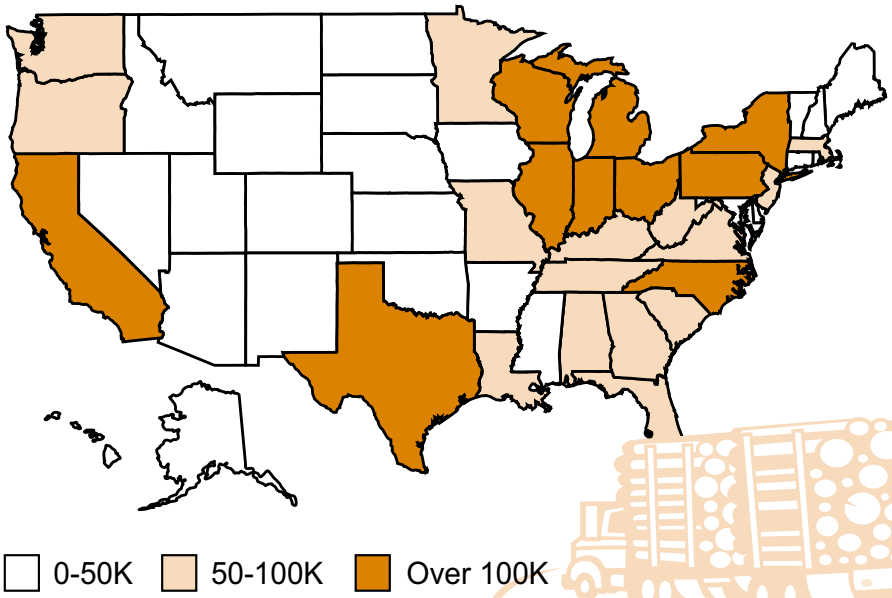
Industry Trends

Average Hourly Wages



Sources: 1997 Census of Manufactures;
U.S. Bureau of Labor Statistics

"Industries of the Future" * Employment by State



Source: 1997 Census of Manufactures

* Includes Aluminum, Steel, Metalcasting, Glass, Mining, Petroleum, Chemical, and Forest Products Industries.

Guest Editorial

$100 Million To Help Seize Gasification Opportunity

by Valri Robinson,
OIT Forest Products Team Leader

An important window of opportunity will soon open as many aging recovery and power boilers in the forest products industry are rebuilt or replaced. If enough companies select new gasification technologies to replace those boilers, the industry could become a net energy supplier and greatly speed achievement of its long-term goals.

But demonstrations will be needed to help prove out gasification technology. So OIT and the National Energy Technology Lab will solicit proposals for the development and demonstration of black liquor and biomass gasification technologies for combined cycle (or gasification-cogeneration) applications. Cost-shared awards of up to $100 million are possible.

Gasification technologies are central to the forest products industry's *Agenda 2020* vision and implementation plan. Broad adoption of these technologies will improve capital effectiveness, energy efficiency, competitiveness, and environmental performance. The industry's electric power capacity would increase by over 200% while greenhouse gas emissions would decrease by over 30 million metric tons/yr by 2020.

Although combined cycle gasification technologies for black liquor and biomass feedstocks are being developed, commercialization has been slow due to the risk and costs associated with early adoption by individual companies. Gasification systems developed under this program will be installed in existing mills to help demonstrate feasibility. The solicitation closes June 19. Visit www.oit.doe.gov/forest for more details.

THE OIT TIMES
"Turning Industry Visions into Reality"

Office of Industrial Technologies, EE-20
Energy Efficiency and Renewable Energy
U.S. Department of Energy
Washington, DC 20585
www.oit.doe.gov

ISSN 1526-2804

Deputy Assistant Secretary for
Industrial Technologies,
Denise Swink

Managing Editor,
Lou Sousa

Reporters,
Kathleen Coleman, Evelyn Kramer,
Gregg Siegel

Designer,
Allen Austin

Content reprintable without permission.
Correspondence, including requests for
additional copies, or to be added to or
deleted from the mailing list, may be
directed to:

Lou Sousa
Fax: (202) 586-9234
E-mail: lou.sousa@ee.doe.gov

Bulk Rate
U.S. Postage
PAID
Permit No. 258
Golden, Colorado

Forging industry taking unique approach to roadmap implementation

During a recent visit to several forging facilities in southern Texas, George Mochnal, Director of Research and Education, Forging Industry Association (FIA), couldn't believe the enthusiasm for the Forging Industry Technology Roadmap! For the first time he was hearing feedback and project ideas from some of the employees often overlooked in the decision-making process – the plant workers themselves.

"This is a good lesson-learned," explained Mochnal. "So many times we solicit feedback from plant engineers and managers, when often the shop floor personnel have different and often better solutions to existing problems."

Mochnal visited Wyman-Gordon, Texas Metal Works, Forge Products, Inc., Ellwood Texas Forge, Reed Tool Co. and Interstate Forging Industries. Prior to the visit, several companies distributed copies of the vision and roadmap to employees, explaining the process and discussing ideas. The forging industry technology roadmap is similar to the nine Industries of the Future roadmaps, identifying strategic objectives and energy efficiency goals. "The excitement in these plants, where employees feel their companies are taking a proactive stance to remain competitive, was amazing," said Mochnal.

In a unique approach to education, FIA has also established an "online university" with classes in areas such as management, human resources and sales. FIA is developing a roadmapping seminar to further educate industry on the research process and the implementation of technology. Mochnal believes the more an employee knows about the process, the more likely he or she is to generate ideas and encourage others to get involved.

Headquartered in Cleveland, Ohio, the Forging Industry Association is comprised of over 150 North American producers of forged metal components. For more information, visit the their website at www.forging.org.